ROCKS and MINERALS

A MAGAZINE FOR MINERALOGIST, GEOLOGIST AND COLLECTOR

PUBLISHED MONTHLY --- FOUNDED 1926

VOL. 11, No. 1 WHOLE No. 55

Contents For January, 1936

Entered as second-class matter September 13, 1926, at the Post Office at Peekskill, N. Y., under the Act of March 3, 1879

Copyright 1935 by Peter Zodac. Title registered in U. S. Patent Office

Specially written articles (as Contributions) are desired.

Subscription price $1.50 a year; foreign $1.75. Current numbers, 15c a copy. No responsibility is assumed for subscriptions paid to agents and it is best to remit directly to the Publisher.

Issued on the 1st day of each month.

Authors alone are responsible for statements made and opinions expressed in their respective articles.

ROCKS AND MINERALS PEEKSKILL, N. Y., U. S. A.

The Official Journal of the Rocks and Minerals Association

GILBERT HART — *Geologist*

Examinations ***Appraisals***

CENTRE, ALABAMA

STEPHEN VARNI CO., Inc.

Dept. R

Cutters and Importers of Unusual Gems

Correspondence Invited **15 MAIDEN LANE, NEW YORK, N. Y.**

MINERALS FOR EXCHANGE

Amethyst—Colorado; Beryl—Maine, Conn., N. Y.; Spodumene—Conn.; Colored tourmaline in lepidolite, etc.—Maine; Hexagonite—N. Y.; and many others.

DAVID M. SEAMAN
6321 Howe Street Pittsburgh, Pa.

Free—Mineral

A piece of pink fluorescent calcite 1 x 1 inches free to anyone sending for our new list with 6c stamps to cover mailing cost of calcite.

AMERICAN MINERAL EXCHANGE
212 Pacific Ave. Houston, Texas.

FROM THE EUROPEAN GEM CENTER

Collection of 20 Gem Stones, in attractive box.

Sapphire	Amethyst	Garnet	Hematite
Opal	Topaz	Moonstone	Moss Agate
Carnelian	Rock Crystal	Amazonite	Malachite
Tourmaline	Agate	Turquoise	Tiger Eye
Aquamarine	Rose Quartz	Bloodstone	Aventurine

Sizes ¼ inch to 1 inch

$2.50—sent postpaid (with one each cut stone $5.00)

Full value guaranteed. U. S. references furnished.

The same collection, however smaller specimens, at $1.15 and $3.50 resp. Refractometers, spectroscopes, dichroscopes, hardness testing pencils, Microscope quartz optic lenses, prisms, Quartzglass apparatus.

Address GEORGE O. WILD, Idar, Germany

ZEOLITES and OTHER MINERALS
For Which New Jersey is Noted

EVERY SPECIMEN IS A GOOD ONE

A few special Holiday Collections left over — 36 Specimens, 1½" x 1½" average size in a neat compartment box—$3.00 while they last.

Send for Price List.

NEW JERSEY MINERAL EXCHANGE

25 HAMILTON STREET, PATERSON, NEW JERSEY

Wm. C. Casperson, Manager.

P. S.—Saw your Ad. in Rocks and Minerals

ROCKS and MINERALS

Edited and Published by Peter Zodac

PUBLISHED MONTHLY

The Official Journal of the Rocks and Minerals Association

JANUARY 1936

VOL. 11, No. 1

WHOLE No. 55

Mineral Collecting In Norway

By RICHMOND E. MYERS

When one thinks of Norway one does not as a rule associate Europe's most northern country with minerals. Her fame usually lies in her chief tourist asset, her stupendous scenery; fjords reaching in some cases over a hundred miles into the mountains that meet the seas along her almost countless miles of rockbound coast that extend from the warmer latitutes of 59 degrees to the roof of Europe. There under the midnight sun Nord Kap majestically stands out into Barents Sea pointing the way still farther north to Svalbard and the Arctic ice.

Yet these very conditions should more or less be sign posts to the Mineralogist that Norway has something to offer the collector who cares to come and search. Mountains, twisted and folded, seared by ice and squeezed again; here surely one should find minerals. A country that for years has been of great interest to Geologists, should have something of interest for the Mineralogist. So I thought several years ago when visiting Norway for the first time, even before I had become a devotee of the hammer and cold chisel. Therefore, when casting around last spring for a likely region in which to spend some time collecting in the summer ahead, my thoughts returned to Norway. Convenient steamship sailings settled the matter.

Once the decision had been reached, I set out to secure as much information as I could possibly find in America concerning the Norwegian localities. Time and lack of facilities hampered these efforts but I took it upon myself to write to a number of our authorities who I felt would be able to direct me, and received in that manner some valuable information, not only as to where the localities were in Norway, but where to find additional information once I reached the scene of activity.

It will be the purpose of this article to pass this information along to the readers of ROCKS and MINERALS, augmented by the data which I have secured during the two collecting trips I made in Norway this past summer, for possibly it may aid someone else who will be interested in Norway's minerals. I trust that it will.

I shall give you the accounts of my two trips exactly as I made them. The itineraries I followed can be greatly improved upon, and at the end of this article I shall include a suggested trip, combining both of mine, in the easiest possible manner.

Accompanied by Mrs. Myers, we sailed from Brooklyn direct to Norway on the S. S. Stavangerfjord. Our first objective was Oslo, for here lay our first move, a visit to the University and its fine collection of Norwegian minerals, which may be seen in the "Mineralogisk-Geologisk Museum." This museum is located some distance

from the University, but may be reached from the center of the town in about ten minutes by tram No. 17. The staff in charge were very kind and aided us greatly in forming our plans, for after carefully looking over the exhibits and noting the localities of the Norwegian minerals, they helped us check over maps and set our course. A word regarding maps will be in order here. The Norwegian Geological Survey publishes topographical sheets similar to those of the U. S. Geological Survey. They are easily read, and show the exact location of all mines and quarries. Our first trip embraced two well-known mining localities, and for it we bought the following maps, (1) the Tonsberg-Stavern-Skien sheet, and (2) the Kongsberg sheet. These may be purchased in any book store for about twenty-five cents in our money. Armed with these maps and a letter of introduction from the office of Prof. J. Schetelig, the curator of the museum, we set out for Larvik.

Now Larvik is a small town at the head of the Larvikfjord, which opens into the Skagerak just below the mouth of the Oslofjord. It lies about 100 Kilos south of Oslo. We went by train, changing at Drammen, but this is a long-drawn-out performance, lasting from about 1:30 P. M. to 8:30. Norwegian trains have a habit of stopping about ten to fifteen minutes at every station, no matter how tiny, particularly on branch lines, and the line from Drammen to Larvik is just that kind of a line. One can go from Oslo to Larvik by boat, which is by far a more pleasant experience. However the railroad train began to pass quarries about an hour before we reached Larvik, and we were able to get some kind of an idea as to where we would be working the next day.

Larvik is famous for its Larvikite, or Labradorite as we call it. There are about two dozen quarries within a radius of ten English miles of the town. (By the way, a Norwegian mile is equal to six of our miles, so if a Norwegian tells you that a place is only two miles ahead, don't think you can walk there after supper). These quarries produce two distinct grades of Larvikite, the light and the dark. It is used in Norway for building stone and ornamental work in general. Around Larvik one sees it predominating in the churchyards, as it takes a beautiful polish. It is also seen in every railway station restaurant, where it serves the purpose of table tops. It is this stone that is used for ornamental work in the Chrysler Building in New York. Unpolished it exhibits a beautiful play of colors, but when polpolished it is even a more beautiful stone. The darker varieties seem to polish into more attractive pieces resembling butterfly-wing work.

The easiest quarries to reach are those at Byskoven, an hour's climb over the hill north of the town on the bus route to Kongberg. The bus will take you within a ten minute walk of these quarries, but the most interesting are those in the vicinity of Löve (at times spelled Lauve) railroad station, known as the Tjolling Mines. They may be reached by taking train to Löve, and walking from there (about fifteen minutes), or by bus by way of Tjolling from Larvik, direct to the "mines". These quarries are famous for the darker variety of Larvikite. They are the largest in the region, and maintain a polishing shop to which all the material mined in that region is sent for finishing. One of the quarrymen here speaks English, having worked for several years in the Vermont quarries. He proved an excellent guide, and loaded us with polished specimens not only of the Larvikite, but also of marble from various districts in Norway, as the polishing shop does work for a very large area. In locating these quarries take care, for although actually called "Tjolling Mines," they are much closer to Löve, but this seems to be another old Norwegian custom. From here it is about a two hour's walk back to Larvik, through beautiful countryside, and well worth hiking as the road passes the Tjolling Church. In its churchyard can be seen fine specimens of the stonemasters' handicraft in Larvikite, to say nothing of a beautiful old church.

Our next destination was Kongsberg and its famous silver mines. Having had a taste of Norwegian hinterland railways, we decided in favor of the bus, for here was a direct form of transportation. It proved interesting indeed, for we spent about six hours passing through a long narrow valley thrusting its way inland between mountains that would tempt any Geologist. However our objective was the

mining region that produced the bullion for Norway's currency for several hundred years, and in spite of tempting quarries and exposures, we stayed on the bus to the end of the run. A word about the bus might not be amiss. In Norway the busses are much smaller than our Greyhound varieties. The drivers know every farmer along their runs, and one of their numerous duties seems to be running errands in town for each farmer. The bus starts out loaded in front with all kinds of packages. Folks wait along the road for the bus, receive their package, have a little chat with their friend the driver, and then off you go with everybody happy. (You may bring with you as much baggage as you like, even to bicycles and bags of mineral specimens). Although not much faster, it is much cleaner, and far more interesting than the train.

In Kongsberg visit the mint before you do anything else. Housed within its walls is a fine collection of Kongsberg minerals, with excellent speciments of the wire silver for which the mines are famous. Before visiting the mines this collection should be studied with care. The official Geologist of the mines, Prof. Stern, is in charge of the collection, and from him we received permission to visit the mine, (which is government owned), at Saggrenda, and work over the dumps.

To reach Saggrenda one may go by train or bus. One is as good as the other in this case, for Saggrenda is just around the corner from Kongsberg, the first station on the railroad. The bus takes a little longer, but both leave you off about the same walking distance from the mine. Prof. Stern has an office at the mines, and thanks to his kindness, we were given the run of the plant including of course the dumps. We spent a day on these enormous piles of the waste of centuries, and although they have been worked over many many times, they are still very productive for the mineral collector. We secured a nice supply of the following minerals which are characteristic of the locality:

Native Silver: only in tiny fragments. Naturally very little silver finds its way to the dumps. We did purchase a specimen of the wire silver on the assurance from Prof. Stern that that was the only way to get it.

Argentite: both in grains and at times massive.

Ilmenite: found as coatings on the igneous rocks of the dumps, also in tiny massive pieces.

Garnets: thousands of well formed crystals of various sizes.

Fluorite: purple, green, and white, in massive pieces and well formed crystals. Fluoresces a deep blue under bulbs.

These five minerals are not the only ones found at the mines. They merely represent the most common. About twenty others have been found on the Saggrenda dumps. Time and rain prevented our working as thoroughly as we would have liked. Every hour or so a shower came up, and we had to run for shelter. When it rains in Norway, it pours, making a good job of it. Regarding the origin of the Kongsberg silver, it is probably hydrothermal, "having been deposited from hot aqueous solutions representing residuum from the crystallization of igneous rock." Immediately north of the mines is a huge batholith from which dikes radiate southward, and the mining is done along these dikes. The Saggrenda Mine is one of about five or six that are located along these dikes, running along the opposite side of the mountain from the city of Kongsberg. All of these mines are run by the Norwegian government.

Our time in this territory was cut short by the necessity of returning to Oslo in order to sail with the S. S. Stavangerfjord for a cruise north through the fjords via North Cape to Svalbard and the Arctic ice pack. On this cruise, owing to a limited number of hours in our ports of call, we were unable to do any serious collecting until we reached Spitzbergen, the largest island of the Svalbard group, where we had ample opportunity to investigate the mining regions of the Arctic archipeligo. But we shall speak of Spitzbergen in another article. En route north we did have several stops that enabled us to secure good specimens. In Trondheim we visited the stone masons' shop at the cathedral. This ancient church is being rebuilt and receiving a partially new exterior, so specimens of Norway's finest marbles were to be had for the carrying away. Beautiful

broken pieces of polished and unpolished marbles of all shades from black to white rewarded our visit. One variety in particular, which the stonemasons called "Bacon Marble" because it looked for all the world like strips of raw bacon, was very attractive.

Again at Narvik, where the ore from the iron mines of Swedish Lapland is loaded on ships, we found some "easy pickings" in the train loads of magnetite on the wharves. Malachite, Pyrites, Chalcopyrite, Ilmenite, and a few other of the minerals often found with magnetite deposits rewarded our search, and made us wish that we had time to visit the mines themselves, only a few hours distance. We did go by train to Abisco from Narvik, with the hope that there would be some mine close to the station, but we found that the nearest was an hour or two further on, so we had to give up the idea, as the Stavangerfjord waited for no one. Taken as a whole, northern Norway has more to offer the Geologist than the mineralogist. At North Cape we picked up some nice smoky quartz, and some epidote crystals, but nothing out of the ordinary. We were really more interested in the locality than the mineral itself.

On our return from Svalbard we left the ship at Kristiansand S., for our second collecting expedition in Southern Norway. This time we aimed at a region considerably south of the Larvik-Kongsberg regions. Our first objective was some nickel mines that we had learned "were in the vicinity of Kristiansand," and then to move northward along the coast to the famous Arendal and Kragero localities.

At Kristiansand inquiry soon disclosed that the nickel mines were a half day's railway journey north, at a place called Evje. The smelting plant was at Kristiansand, so we called at the company's offices which were located close by the Ernst's Hotel. The name of the company is "Raffineringsverket," and the manager was only too willing to help us. He arranged for us to go up to Evje the next day, and gave us detailed information concerning the Evje region. That afternoon we visited the smelting plant in Kristiansand and examined with little success, several car-loads of feldspar we found on the docks. The next day we boarded a little gasoline propelled train, and headed for Evje.

We were met at the station by the mine superintendent, Mr. Thorvkildsen, who drove us to the mine, and pointed out several feldspar and quartz quarries along the road, that were known as good mineral localities.

At this point a few words about these two mineral industries will not be out of place. Nickel has been mined at Evje for almost a quarter of a century. Combined with the output of some newer mines north of Bergen, the company produces between 1000 and 1500 tons a year of finished nickel from Norwegian ores. Practically every bit of ore is refined at Kristiansand. The ores are similar to those of Sudbury, Pyrrhotite being the principal ore with Niccolite and Millerite also occuring in usable quantities. Chalcopyrite is found in profusion, and some Cobaltite. We found good specimens of all of these on the dumps, as well as: Quartz crystals, Azurite, Calcite, and minerals of an ordinary nature. As to the Feldspar industry; this is undoubtedly the most important mineral industry in southern Norway. There are dozens of quarries, active and abandoned, scattered from the district around Kragero down to Evje. The occurrence is similar to that of the spar in south-eastern Pennsylvania, and it is found in the gneiss and schist where it is usually deposited in the form of pegmatite dikes or veins. All types of feldspar occur, the Albite being the more common in the Evje region.

As mentioned before, we had seen some of the spar lying around on the Kristiansand docks, but our first actual contact with the quarries and their associated minerals was at Evje. Here we worked in several of the quarries with excellent results. In all of these the spar occurs with Epidote (well crystallized), Mica, and Quartz. Other minerals occur in some profusion, but not in all the quarries.

Just below the nickel mines on the road back to Evje (the mines by the way are a few miles outside of the town) is a deep-cut quarry, almost a mine, where we spent an afternoon with the following results:

Enormous sheets of mica, several feet square.

Beautiful smoky quartz crystals, from 1 to 4 inches, well formed. Crys-

tals also of clear and milky quartz. Many twins, and excellent phantoms of smoky inside clear crystals.

Euxenite in good sized masses and some crystals.

Amazonstone.

Fergusonite in small quantities on contact planes between micas and spar.

(It was from one of the quarries in this region that Mme. Curie's radium (pitchblende) was secured for a great deal of her earlier work, but none has been found for some years. Prospecting is still being done for another "strike.")

The major feldspar districts however lie nearer to the coast in the vicinity of Arendal and Kragero, so from Kristiansand we took a small steamer up to Arendal. Here we contacted with Mr. Peter Callin, whose father Mr. C. P. Callin has been connected with the feldspar industry around Arendal for many years. Under his guidance we visited the best of the Arendal localities, and I shall merely list these with their major minerals.

At the Landbo Mine one can find massive pieces of golden Pyrite, many as large as a man's head, some even larger. Pyrite also occurs in tiny crystals, similar to the deposits in the French Creek localities of Pennsylvania. Euxenite and nice smoky quartz are also in evidence. Of course, here as in all other localities, there is an abundance of micas.

Although no different minerals will be found at the Lövrak Mine, it is well worth a visit for two reasons. First because of the beautiful whiteness of its spar, and secondly because of the great underground workings. The mine is supported by columns of the spar left standing, and lighted by occasional openings in the ceiling. The roof is vaulted, giving it the effect of a large underground cathedral, and is truly a magnificent sight.

On the road to Askland are two quarries of special interest. Along the lake just south of Askland a quarry opens directly on the "highway," and is highly productive in Tourmaline. The exposed bed of the lake at this point (due to drought) is of solid rock and simply reeking with Tourmaline. The low water gave us easy access to these tourmalines, and we "bagged quite a catch" as Mr. Callin termed it.

Just before reaching the lake, another small quarry will reward the searcher with more Tourmaline, and also excellent crystalline masses of Apatite, Epidote and Actinolite. The quarryman here puts aside anything of interest that he finds while working (it is a one-man quarry) which he proudly presents to interested visitors.

However, the most inaccessible quarry offers one of the best prizes. On the top of a very steep hill, so steep that an overhead cable tramway is used to lower the spar down to the road some distance below, is a quarry known as the Jomaas Quarry, because the hill overlooks that particular crossroads. It is a hard climb up but worthwhile. Here one will find Anthophyllite in long needle-like crystals, some over a foot in length, bunched together in masses. The mineral is a beautiful green color, and the needles vary from the size of a pencil to those so small that they might be called hair-like. These fine crystallized pieces are velvety in appearance, but very difficult to handle, and tiny pieces break off and become imbedded by the dozens in one's hands, even through gloves. Several varieties of Amphibole are also to be found in this quarry.

In naming these localities I have used the place names as designated on the topographical maps. The one covering this region is called the "Nedenaes Amt" sheet. The names do not represent the names of towns, merely places, and as a rule they are family names of the largest landholder in that particular vicinity. I would suggest to anyone who might care to follow our footsteps in these parts, that they get in touch with Mr. Peter Callin at Arendal. That will not be difficult, as the only Callins in Norway happen to be his immediate family.

The quarries are all worked by the owners of the property in which they have been opened. They in turn are financed and equipped by the Feldspar companies of Arendal, who then buy the spar on a contract basis. Some individuals are prospecting for spar all the time. When they locate an outcrop, they take samples into the company and if it proves worth while, they get in touch with the owner of the property and make a deal. A great bulk of this spar is shipped to Denmark and Germany.

The district around Kragero is even better known for its minerals, but we spent too much time around Arendal, and had to hurry by Kragero enroute to Olso in time for the westbound sailing of the Stavangerfjord. Sailing past Kragero we saw many quarries right along the water's edge, which should make it fairly easy to reach many of the localities via motorboat. However, we had to leave Kragero for another year.

Now just a few words in general about collecting in Norway. To begin with, use a trans-Atlantic line direct to Norway, and return with the same line if possible. This will render the disposal of your specimens as you go along quite easy, for you can mail them to your ship, and find everything waiting on board for you when it is time to sail home. If you were sailing from a non-Norwegian port there would be customs complications, and all kinds of red tape. You might even lose your specimens. Ship them in a good heavy canvas collecting bag, with a draw string opening. A good supply of these is very necessary. You do not have to speak Norwegian. Of course if you can, all the better, but one will always find some quarry hand or miner, to say nothing about engineers and superintendents who speak English quite well. Remember, educated folk in Norway as a rule have English as part of their equipment. As to getting around, where bus lines and railways can't take you, automobiles will, and a car and driver may be hired for as little as six dollars a day. We ourselves did a good bit of walking because we liked it, but with a very few exceptions that is unnecessary.

And now for that suggested itinerary: starting from Oslo, go by train to Kongsberg, from there proceed by bus to Larvik ,and then by boat down to Kragero. You may go on by boat to Arendal, and there take a bus to Evje. From Evje you will have to take the train to Kristiansand. From this port if you wish you may sail back to America, or you may reverse your itinerary, getting off the ship at Kristiansand, and ending your collecting at Oslo, but it is best to see the Oslo collection before you start. To cover this route thoroughly, allowing ample time at each place, I would say allow three or four weeks. This is in Norway of course. You can reach Norway in eight days from New York, so if pressed for time you could do everything in five or six weeks. That is just a thought for some future summer. Remember, it hardly gets dark before 10 P. M. in southern Norway, so your days are long. In closing, the writer would like to say that he will be happy to pass along more detailed information to anyone who might be interested.

Norwegian Mineral Collecting Tour

A Norwegian Mineral Collecting Tour, sponsored by ROCKS *and* MINERALS, and directed by Richmond E. Myers, will be conducted during the Summer of 1936. The Open Road, 8 West 40th Street, New York City is in charge of travel and business arrangements.

The tour is scheduled to leave New York City, July 4th on the S. S. Bergensfjord of the Norwegian American Line and to return to New York City August 13th.

For copy of rates, itinerary and other information apply direct to

Richmond E. Myers, 222 E. Union Street
Bethlehem, Pa.

Minerals of the District of Columbia and Vicinity, With Pertinent Bibliography

By DR. TITUS ULKE

FOREWORD

About 50 years ago the writer gathered a collection of the minerals of the vicinity of Washington, D. C., comprising those species then known to occur within a radius of 20 miles of the Capital. This small collection was presented to the Smithsonian Institution and exhibited under the direction of its late mineralogist, Dr. G. P. Merrill, in the old National Museum building, and was probably the first comprehensive local mineral collection of which there is a definite record.

It was subsequently incorporated in a much larger D. C. collection, which is now on exhibition in a wall-case of the Meteorite Hall of the U. S. National Museum.

Since the above date a large number of additions have been made to my old check list of about 30 minerals, which additions consist largely of species discovered while excavating rock beneath the city for the Waterworks Extension Project, in the years 1883 to 1885, and in mines and quarries about Mineral Hill and Baltimore, Maryland, and near Leesburg, Virginia.

My present object is to bring the list of minerals found within a radius of about 50 miles from our Capitol up to date, to widen the scope to cover Maryland and Virginia and to indicate briefly where and under what geological conditions the minerals occur.

The number of different species and varieties of minerals discovered to date in Maryland and Virginia is about 125, of which 85 are definite species.

That this number, while substantial, is not larger is due chiefly to the rather limited variety of rocks occurring about Washington, and to the scarcity here of extensive ore-bearing veins and dykes, with their usual accompaniment of many kinds of associated minerals, which would augment the number of minerals.

As regards our local geology, a study of the geologic map of the District (see Bibl., Darton and Keith, Washington Folio, 1901) reveals that our region is physiographically separated by the "fall line" into the Coastal Plain —a region of broad, open valleys, on the southeast and northeast, and the Piedmont Plateau—a region in which the streams run chiefly in narrow steep-sided gorges, on the northwest and west.

These contrasting physiographic features in turn are due to the differences of their geologic origin and subsequent modification, the Coastal Plain being occupied by sedimentary rocks of an age not earlier than the Cretaceous, and which consist chiefly of unconsolidated gravels, sands, marls, loams and clays, while the geological formations of the Piedmont Plateau are igneous and metamorphic rocks of very early geologic age, possibly dating back some hundreds of millions of years.

The rocks of the Piedmont are chiefly granites, gneisses, mica or hornblende schists and diorite, with local exposures and intrusions of such basic igneous rocks as diabase, gabbro, peridotite, pyroxenite and amphibolite, together with their usual metamorphic alteration products, serpentine, talc and soapstone.

The breaking down of each of these two main categories of rocks, namely the silicious (or acid) granitic rocks (see Bibl., **Merrill,** A. 1895), and the basic igneous rocks, determine the nature of the prevailing soil, which, in turn, largely determines the character of the local flora (see Bibl., **Wherry,** 1917).

Similarly, certain minerals are distinctive of each of the above physiographic regions and are practically confined to them. For example, **Glauconite, Vivianite** and the 5 iron ores, namely, **Limonite, Hematite, Turgite, Goethite** and **Siderite,** occur, with hardly an exception, in the Coastal Plain only, while **Sphene, Zoisite, Rutile, Cyanite** and the 7 zeolites, **Analcite, Datolite, Chabazite, Heulandite, Natrolite, Laumontite** and **Stilbite,** have only

been obtained in the Piedmont. However, most of the local minerals are common to both physiographic regions, and are found either in place in the rocks or strata, or occur loosely in gravels or boulder heaps brought down by stream or ice from regions far to the northward of Washington.

Finally, some beautiful and unusual varieties of quartz and chalcedony are particularly represented among the Indian artifacts not infrequently picked up about Washington.

The descriptions of the minerals in the text follows Weisbach's "Synopsis Mineralogica" (see Bibl., Weisbach, 1884), Dana's "System" (see Bibl., **Dana,** 1896) and Naumann-Zirkel's "Mineralogie" (see Bibl., **Naumann-Zirkel,** 1885).

In connection with the following list the author wishes to acknowledge the kind assistance of Dr. W. F. Foshag and Mr. James Benn, of the U. S. National Museum staff, in furnishing information with regard to the occurrence of some unusual minerals in this vicinity, and in revising the manuscript.

Each of the 85 species, and 40 varieties listed with but few exceptions, are represented by regonally collected specimens either in the "D.C. Collection of Minerals and Rocks" in the U. S. National Museum, or in the "Titus Ulke Collection of Minerals and Rocks" from the D. C. and vicinity, located in the Geological Department of the Catholic University at Brookland.

List of Minerals and Their Local Occurrence

1. **Albite.** Soda Feldspar.

Albite is a constituent of many crystalline rocks and with hornblende is found in diorite and with orthoclase or microcline in most of our granite and gneiss. A crystalline mass of white albite was discovered in diorite by John W. Langdale in the District of Columbia in 1894.

2. **Amphibole.** Hornblende. Varieties: Tremolite, Actinolite, Smaragdite and Asbestus, including "Mountain-leather."

Found largely in the greenstone or diabase rocks of our region. As hornblende, especially of the tremolite type, is liable to alteration, it often occurs fibrous as the variety asbestus or rarely as mountain leather, both found in the Goose Creek Trap Rock Quarry near Leesburg, Va.

Tremolite—bearing rock, with a fibrous crystalline mass of tremolite, was obtained in the Howard University Shaft of the D. C. Waterworks Extension Project in 1884.

Actinolite with calcite was found in Georgetown in 1891, and with prochlorite, rutile and quartz in the Foundry Run Shaft, D. C.

Smaragdite and **Hornblende,** forming an altered gabbro, were obtained in the Howard University Shaft at a depth of 130 feet.

Hornblende schist (or **amphibolite**) was collected in the Foundry Run Shaft, as was also massive **hornblende,** associated with epidote and quartz.

3. **Analcite.**

Analcite was found by Langdale in very large, grayish-white, deltohedral crystals 1 inch in diameter, imbedded in quartz and calcite, in the District.

4. **Andalusite.**

Found in a fragment of mica schist in bed of Rock Creek, D. C.

5. **Ankerite.**

Occurs in steatitic gabbro, associated with massive quartz, chlorite, small cubes of limonitic pyrite and needles of black tourmaline, at the Huddlestone Gold Mine, near Bethesda, Md. (See Bibl. Ulke).

6. **Apatite.**

This mineral, which heretofore had been found locally only in microscopic crystals, was discovered in 1884 in large crystals or crystalline masses imbedded in white quartz in a vein in a shaft at Rock Creek near the M Street Bridge. The largest crystals found were some 2 cm. in diameter, of hexagonal outline and of a light yellowish-green color. The majority of the specimens were, however, distorted and of irregular form. On account of their being imbedded in tough, massive quartz, it was impossible to obtain perfect crystals free from gangue, and all obtained were more or less shattered and broken. (See Bibl., Merrill, B). Fine crystals of bluish-green apatite, however, were found in quartz near Howard University in 1892. Hexagonal prisms of grayish apatite, imbedded in large crystals of beryl, were secured by the writer at the Kensington Mica Mine, Md.

7. **Apophyllite.**
Occurs with prehnite as vein filling in diabase in the Traprock Quarry near Leesburg, Va.

8. **Aragonite.**
Fibrous incrustations with marcasite on lignite logs in stream bed of Cameron Run, Virginia. Also among debris of bivalve shells, which are made up, in part, of aragonite.

9. **Autunite.**
Found in the Kensington Mica Mine, Md.

10. **Axinite.**
Occurs with diopside and chalcopyrite in diabase seams at Traprock Quarry, Leesburg, Va.

11. **Azurite.**
Occurs usually with malachite and often with limonite and wad, and in stains on gabbro from a quarry near Falls Church, Va.

12. **Barite.**
Occurs massive near Leesburg, Va.

13. **Beryl.**
Occurs in coarse pegmatite, associated with muscovite, quartz and orthoclase, cinnamon-colored garnets and gray apatite, in the abandoned Kensington Mica Mine near Sligo Creek, Md. Found also in pegmatite dikes along the upper Patuxent River, Md.

14. **Biotite.** Magnesia Mica. Varieties: Phlogopite (Brown Mica) and **Lepidomelane** (Black Mica).
Occurs in biotitic granite and gneiss, as in many of the so-called "bluestone" quarries in the valley of the Potomac River and in the Piedmont hills of Maryland and Virginia, as well as in black or brown mica schist. An aggregate of black mica, in scales, was obtained in the Rock Creek Shaft and 230 feet east thereof in the tunnel.

15. **Bornite.** Purple Copper Ore.
Occurs massive or disseminated, with magnetite, malachite and chalcopyrite at Mineral Hill, Carroll County, Md., about 35 miles from Washington, D. C., and also at Widewater, along the C. & O. Canal in Maryland.

16. **Calamine.**
Often found as crusts on yellow, earthy masses in the Austin Mine, Va.

17. **Calcite.**
As pebbles of limestone (a compact granular variety) and as marl (a mixture of calcite and clay) calcite is found in the Coastal Plain. Marl is exposed in deep cuts in Oxon Run, Maryland. Calcite in crystals has been found with stilbite in altered diorite in the Waterworks Tunnel, 112 feet west of Reservoir Shaft, near Howard University.
Calcite with laumontite occurred in the Rock Creek Shaft and in diorite in Georgetown.
Calcite on altered diorite was obtained in the Howard University Shaft, and on fresh diorite in the Rock Creek Shaft.
Calcite with actinolite occurred in Georgetown.

18. **Cerussite.**
Incrusting and intergrown with galena in float among gravel about 20 feet below surface at Constitution Avenue, between 22nd and 23rd Streets, Washington, D. C., March, 1933.

19. **Chabazite.**
Found with stilbite on diorite near Howard University in 1895.

20. **Chalcanthite.** Blue or Copper Vitriol.
On weathering copper ores at Mineral Hill, Md.

21. **Chalcopyrite.**
Found with pyrite and quartz in chloritic schist in an old mine near Bethesda, Maryland, and at Mineral Hill, Carroll County, Md.

22. **Chromite.**
Sometimes coated with green garnet; often found in serpentine. Formerly large ore bodies of chromite were profitably mined in several localities northeast of Baltimore, Md.

23. **Chrysolite.**
In imbedded grains in local peridotite.

24. **Copper.** Native Copper.
Often with calcite, cuprite, malachite and other copper-bearing minerals, usually tarnished brown on surface. Found in the Blue Ridge Mountains in epidote-bearing eruptives peppered with native copper in small amounts.

25. **Cyanite.** Kyanite.
Found principally in gneiss and mica schist. Kyanite in diorite was discovered near Chain Bridge, D. C., by Langdale in 1896.

26. **Datolite.**
In crystals on altered diabase at the Goose Creek Traprock Quarry, near Leesburg, Va.

(To be Continued)

Treatment of Fragile Specimens

By CHARLES R. TOOTHAKER

Museums and private collectors get many specimens that for one reason or another will not bear handling and specimens which may be damaged by air or dampness.

The treatment I shall describe depends on the use of colorless transparent lacquer. I use chiefly a preparation sold under the name "Du Pont 4426 Cement." It is I think essentially the same thing as Duco Household Cement but much thinner. If you cannot conveniently purchase the clear lacquer, I believe you will get perfectly good results by squeezing some Duco Household Cement out of the tube and thinning it with acetone until it is thinner than ordinary varnish. Mix this lacquer with a liberal amount of common sense and that is all there is to the process. For example, you may have a specimen of pyrite crystals on a base of magnetite from French Creek, Pennsylvania. Every time you handle the specimen little grains of magnetite fall off. In the first place see that the specimen is clean. Then make sure that it is perfectly dry—I prefer to put it in a warm place for quite a while, not so warm that the specimen becomes hot but nice and warm so it will be sure to be thoroughly dry inside. Now flow your lacquer on the magnetite liberally with a soft brush, not on the crystals but on the back and edges of the specimen. When dry the coating is practically invisible but grains will no longer drop off. Never put the lacquer on a crystal surface unless you are forced to do so.

You may have a marcasite or even a pyrite that is sure to form a white powder and will, in time, fall to pieces. First brush it thoroughly and get it as clean as you can but do not use water. Then warm it very gently for a long enough time so that you feel sure it is dry inside as well as outside. While it is still warm flow the lacquer on it. I prefer not to cover bright crystal faces but to be sure to get the lacquer in every crack and crevice. Sometimes it is best to cover even the faces of a marcasite and rarely of a pyrite. Here is where common sense is needed.

I have a few very delicate frail specimens which have been greatly strengthened by putting a good coat of straight Duco Household Cement on the back. The advantage of this material is that whether it is the Household Cement or the lacquer it can be removed in a bath of acetone at any time, if you ever want to get rid of it.

Another trick is useful if you have specimens displayed in a glass case. Some specimens are of a flat shape and will not stand up but look so much nicer in a fairly erect position. Take a piece of stiff galvanized wire. Put two or three drops of Duco Household Cement in some notch on the back of the specimen (use plenty). Put the end of the wire in the cement, support the wire at a convenient angle, and let the cement harden. The wire is to take the place of an easel. In the beginning make the wire a little too long and after the cement is dry cut the wire off to just the right length. If the back of the specimen is smooth, mix some absorbent cotton in the cement so as to help the wire to get a firm hold. Try this and you will be surprised at the strength of your invisible easel.

Halotrichite Found Near Freeland, Pennsylvania

By JOHN J. S. SHRADER

Recently, workmen found an attractive, unusual stone on the "rock table" (waste conveyor) in the breaker at the No. 4 Jeddo colliery of the Jeddo-Highland Coal Company, near Freeland, Pennsylvania. Not knowing what it was, and wondering if it had any commercial value, they retained samples for identification and analysis.

Due to its appearance it was at first thought to be pyrophyllite but was later found to be halotrichite. It occurs in silky, white and light brown fibrous aggregates; dull, waxy, greyish felted plates; and grey capillary masses associated with pyrite crystals and anthracite disseminated through a schistose matrix.

Chemically, it is a hydrous iron-aluminum sulfate—$FeAl_2(SiO_4)_4$ 24 H_2O—and has the characteristic bitter, astringent taste of the soluble metallic sulfates. Because of its high moisture content, when exposed to dry atmosphere it loses its lustre and becomes friable. To the touch it is greasy, soft, and light. Hardness 1 - 2. Specific Gravity 1.885 to 2.04. It is translucent and leaves a white streak. Before the blowpipe it fuses and expands, with reagents gives a sulphate reaction.

As the Jeddo mines are extensive, it is not known definitely which section yielded the halotrichite. According to mine officials, however, it is from the Mammoth Vein at the bottom of No. 4 slope.

Serpentine at Ishpeming, Michigan

By A. JOSEPH ALESSI

Amateur Geologist Association, Chicago, Ill.

Serpentine is a mineral or rock consisting of a hydrous magnesium silicate and commonly of a green, a greenish-blue, a greenish-yellow or a reddish-brown color. Sometimes it is mottled in appearance, often resembling a serpent's skin, hence its singular name. It is found in a massive, lamellar, or in a fibrous state and is a widely distributed mineral in the Lake Superior Region. Serpentine is formed by the "altering" of peridotites and pyroxenes.

At Ishpeming, Michigan, it is found in contact with quartz, greenstone schist and dolomite. In a visit to an abandoned quarry near Ishpeming, the writer found a specimen showing serpentine in contact with vein quartz, the quartz containing a trace of gold. Another specimen of a bluish-green color showed veins of dolomite peppered with cubes of pyrites running through the serpentine. In the same locality the following minerals also were found: talc, soapstone, asbestos (mass and slip fiber), picrolite, dolomite, magnetite, limonite, milky quartz, iron stained quartz and gold bearing quartz.

Serpentine in its many varieties has numerous and varied industrial uses. It is fabricated into table tops, ornamental stone, containers, shingles, vases, cord, curtains and in the preparation of automobile tires. In its fibrous state it is used as asbestos, for heating insulation and for fireproof cloth.

Serpentine is found in most states along the eastern coast of the United States, from Alabama to Canada, also in such widely separated localities as Texas, Arizona, California and Wyoming.

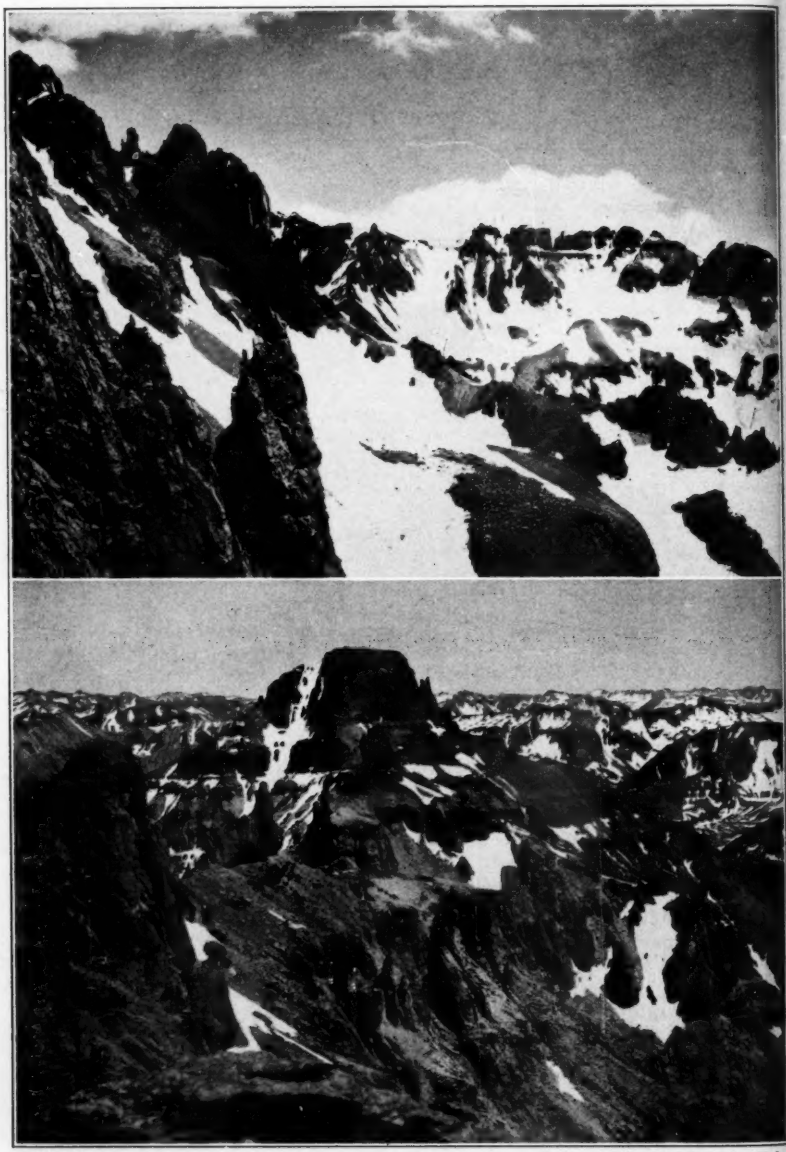

Photo by Lavender *Courtesy Colorado Mountain Club*

(Top)—Gilpin Block Tops, a dissected plateau in the San Juan Range, Colorado.
(Bottom)—Potosi Peak, in the San Juan Range

THE AMATEUR LAPIDARY

Conducted by J. H. HOWARD*

504 Crescent Ave., Greenville, S. C.

Amateur and professional lapidaries are cordially invited to submit contributions and so make this department of interest to all.

*Author of—*The Working of Semi-Precious Stones*, and *Handbook for the Amateur Lapidary*.

"If You Want It You Can Get It"

And now comes H. H. Shivley, Roslyn, So. Dak. with an exploit to prove again the truth of the old adage that "where there's a will there's a way." Let him tell the story:

"* * * all my equipment is home-made and pretty crude. For cast iron laps I use the tops of cast iron automobile pistons. Pretty small but they work O. K. Am going to make some 5" in dia. from piston tops from an old tractor. Have been polishing Quartz and Pyrope Garnet on the cast iron and it works pretty well. I tried an aluminum piston top but it didn't work as well as the cast iron.

"My faceting rig is made entirely of old automobile parts. The base is a large ring gear. Across it is bolted a strap iron with a hole in the center for pivoting the swinging arm. This arm is a Ford T connecting rod with one end sawed off. Through the sawed off end a hole is drilled for the upright rod which is a piece of ½" cold rolled shafting. The swinging arm can be clamped in any position.

"For the index head I used a Ford T spindle with the axle part cut off. I put in new brass bushings and reamed them to a snug fit on the upright rod. The spindle has a hole at right angles to the holes through which the upright rod passes. In this hole I insert the index wheel and lapstick, which is a tractor valve and stem. I cut 32 notches in the edge of the valve, using a three cornered file. I number alternate notches from 1 to 16 and use these for the main facets leaving the un-numbered notches for the skew facets.

"In the end of the stem I drilled a hole to take an ordinary stove bolt. I had no tap to tap this hole and besides, the steel was pretty hard, so to overcome that trouble I drilled a hole through the stem, offset from the center and just intersecting the hole in which the stove bolt is inserted. With a notch filed in the side of the stove bolt at just the right place to jibe with hole through the stem, with a pin driven through the hole and a nut on the bolt drawn up tight against the end of the stem, my lap stick point is rigid and easy to change.

"* * * it is surprising how nicely the whole thing works. My work is nothing to brag of yet, but I sure get a great kick out of it."

A PEEK AT OUR MAIL

Expresses Appreciation

Portland, Me.—I want to express my appreciation for two brief articles which have appeared in recent issues of ROCKS *and* MINERALS. One was by Bill Nisson describing how aragonite and calcite may be distinguished from each other (Aug. 1935, p. 126). The other by O. Ivan Lee on the Cleaning and Restoration of Specimens of Native Copper (Oct. 1935, p. 156). I think that articles of this nature are of great help to those collectors who are not satisfied with collecting specimens merely for their beauty but want to know how to recognize the more common ones and how to improve their appearance. May we have more such articles.—*E. H. Leonard.*

Anxious to Continue Subscription

Los Angeles, Calif.—Please send ROCKS *and* MINERALS for another year. I would not think of letting my subscription expire.—*Henry W. Beitler.*

The Same to You!

Melrose Highland, Mass.—I wish to compliment you on the many fine articles which have appeared during the past year. Good luck to you for 1936! —*George E. Holman.*

Liked the November Issue

Lewiston, Me.—Let me congratulate you on the appearance of the last number (November) of ROCKS *and* MINERALS. To my mind it is the finest number that has come out and it approaches more nearly the ideal number that you should strive for. It is so far ahead of the very early numbers of ROCKS *and* MINERALS. Keep up the good work and do not draw the line too sharply between articles for the layman and for the scientist.—*Dr. Lloyd W. Fisher.*

Getting Impatient

Hartford, Conn.—Why are the Association pins not on sale as yet and why are not outings held monthly instead of once a year?—*A. H. Harris.*

Another Club for Rocks and Minerals

Reno, Nev.—Our Club here has adopted ROCKS *and* MINERALS as its official journal. About twice a year I bring up the subject of new subscribers to our magazine: a few already take it and I hope in time to have all of them on your subscription list. I subscribe to other mineralogical magazines but they don't get as close to me as does ROCKS *and* MINERALS—*Mrs. Rader Thompson.*

Acknowledgments

We wish to acknowledge receipt and express our sincere thanks for specimens and other donations recently sent us by some of our subscribers.

Printz, Harold, Roseburg, Ore.—An assortment of 8 rough and polished sections of agatized wood. This is the finest agatized wood we have ever seen and comes from Oregon; also two fine specimens of red jasper from Jefferson County, Ore.

Shrader, John J. S., Freeland, Pa.—Two interesting halotrichite specimens from a new find near Freeland; also three large photos of scenes around the anthracite coal mine at Coaldale, Penn.

Steward, Luther, Phoenix, Ariz.—A dainty little specimen of fluorescent opal from a new locality near Bagdad, Ariz.

Club and Society Notes

Minneapolis Mineral and Gem Club

Last April, 7 mineral collectors in the Flour City, met one evening and organized the Minneapolis Mineral and Gem Club. It was a success from the very start. At the second meeting 70 were present of which 25 joined. A midsummer outing was held at Lake Minnetonka and an enthusiastic group was present.

The club which meets at the Museum, Public Library, Minneapolis, Minn, has a membership of 50 and dues are $1.00 a year. Roy H. Benham is the Secretary.